

Claims

What is claimed is:

1. A drapery pull system for moving a suspended drapery or the like comprising:
 - an elongated track comprising a housing portion that defines a car compartment;
 - a master car received within the car compartment of the track, the master car comprising at least one pair of roller members each rotatably supported by the master car,
 - a plurality of auxiliary cars received within the car compartment of the track, each of the auxiliary cars comprising a pair of roller members rotatably supported by the auxiliary car,
 - each of the roller members of the master car and auxiliary cars defining a surface that is curved in cross section, the curved surface of the roller members engaging a pair of curved surfaces defined by the car compartment of the track, the curved surfaces of the track adapted to provide for nested receipt of the roller members by the track to facilitate a substantially linear tracking of the master car and the auxiliary cars within the car compartment of the track; and
 - a drive system having a motor and a drive shaft rotatably driven by the motor, the motor being reversible for driving the drive shaft in each of opposite rotational directions, the drive system operably connecting the drive shaft to the master car for driving the master car in one of two opposite directions within the car compartment depending on the rotational direction of the drive shaft,
 - the master car attachable to a drapery to provide for movement of the drapery, each of the auxiliary cars attachable to the drapery to provide for rolling support of the drapery when the drapery is moved by the master car, wherein at least a portion of each of the roller members that defines the surface that is curved in cross section is made from a resilient material to reduce noise by limiting skipping or dragging of the roller members upon contact of the curved surface of the roller member with surface imperfections of the track and to reduce noises associated with rolling contact between the roller members and the track.

2. The drapery pull system according to claim 1, wherein the housing portion of the track further defines a pair of belt compartments on opposite sides of the car compartment and wherein the drive system further comprises:

a drive pulley engaging the drive shaft for rotation therewith ; and

a drive belt extending in the belt compartments of the track and contacting the drive pulley to be driven by the drive system within the belt compartments of the track, the drive belt secured to the master car to transfer movement of the drive belt to the master car.

3. The drapery pull system according to claim 2, wherein the drive belt is made from a resilient material for limiting noise associated with contact between the belt and the drive pulley and to limit noise associated with scrubbing contact between the drive belt and a portion of the track.

4. The drapery pull system according to claim 1, wherein the resilient material of the roller members is polyurethane having between about 70 and about 94 durometer on a Shore A hardness scale.

5. The drapery pull system according to claim 3, wherein the resilient material of the drive belt is polyurethane having between about 80 and about 94 durometer on a Shore A hardness scale.

6. The drapery pull system according to claim 2, wherein the drive belt comprises a toothed surface and the drive pulley comprises notches formed about an outer surface, the teeth of the drive belt engaging the notches on the drive pulley to facilitate transfer of rotation of the drive pulley into movement of the drive belt.

7. The drapery pull system according to claim 1, wherein the master car comprises a pair of carriage bodies and wherein each of the roller members of the master car comprises a wheel having a concave edge and a tire having a substantially circular cross section, the tire being mounted on the edge of the wheel.

8. The drapery pull system according to claim 6, wherein the master car comprises a bracket defining a pair of tabs and a pair of carriage bodies each defining an opening in which the tabs of the bracket are received, each of the carriage bodies further defining a plurality of projections that are adapted for interfit with the toothed surface of the drive belt, each of the carriage bodies further comprising at least one belt attachment element secured to one of the projections, the at least one belt attachment element comprising a tapered end to provide for snap receipt of the attachment element by an opening in the drive belt to secure the master car to the drive belt.

9. The drapery pull system according to 1, wherein the track further comprises a mounting portion that includes sidewalls having inwardly turned ends that define lips on opposite sides of the mounting portion, the system further including at least one cam lock having cam notches defined about an outer edge thereof, the cam notches engageable with the lips of the mounting portion upon pivot of the at least one cam lock with respect to the track.

10. The drapery pull system according to claim 1, wherein each of the roller members of the auxiliary cars comprises a wheel and a tire, each tire comprising a track engaging portion having an outer surface curved in cross section and an inner surface, each tire further comprising annular sidewalls located on opposite sides of the track engaging portion, each tire mounted on a wheel such that the wheel is located within the inner surface of the tire between the annular sidewalls of the tire.

11. The drapery pull system according to claim 10, wherein each of the tires of the auxiliary cars is made from polyurethane having between about 70 and about 94 durometer on a Shore A hardness scale.

12. An assembly for moving support of drapery and the like comprising:
a reversible drive motor;

- 18 -

a drive shaft operably connected to the motor for rotation thereby in each of opposite directions of rotation;

a drive pulley operably connected to the drive shaft for rotation thereby;

a drive belt engaging the drive pulley for transfer of rotation of the drive pulley to movement of the drive belt;

an elongated track defining a housing in which the drive belt is received, the track including a pair of bottom panels;

a master car received within the housing of the track and having at least one pair of roller members supported by the master car, the master car secured to the drive belt for movement in each of opposite directions depending on the direction of rotation of the drive shaft; and

a plurality of auxiliary cars received within the housing each having a pair of rotatably supported roller members,

each of the roller members of the master car and the auxiliary cars supported for rolling movement on the pair of bottom panels, the master car attachable to a drapery to provide for movement of the drapery, each of the auxiliary cars attachable to the drapery to provide for rolling support of the drapery when the drapery is moved by the master car,

wherein the drive pulley includes notches formed on a surface thereof and the drive belt includes teeth formed on a surface thereof, the teeth of the drive belt engaging the notches of the drive pulley to facilitate transfer of rotation of the drive pulley to movement of the drive belt.

13. The assembly according to claim 12, wherein a portion of each of the roller members defines a surface that is curved in cross section that is adapted for rolling engagement with the bottom panels and is made from polyurethane having between about 70 and about 94 durometer on a Shore A hardness scale.

14. The assembly according to claim 12, wherein the drive belt is made from polyurethane having between about 80 and about 94 durometer on a Shore A hardness scale.

15. A motorized drapery pull system for moving a suspended drapery or the like comprising:

an elongated track comprising a housing that defines a pair of concavely curved surfaces;

a master car received within the housing of the track, the master car comprising at least one pair of rotatably supported roller members;

a plurality of auxiliary cars received within the housing of the track, each of the auxiliary cars comprising a pair of rotatably supported roller members,

each of the roller members of the master car and auxiliary cars defining a track engaging surface that is curved in cross section for nested receipt of the roller member by one of the concavely curved surfaces of the housing of the track for substantially linear tracking of the master car and the auxiliary cars within the track,

wherein a portion of each of the roller members of the master car and auxiliary cars that defines the track engaging surface is made from a resilient material to limit noise associated with rolling contact between the roller members and the track and to limit skipping and dragging of the roller members upon contact with surface imperfections of the track; and

a drive system comprising a motor driven drive belt received within the housing of the track and a rotatably supported drive pulley, the drive belt engaging the drive pulley to transfer rotation of the drive pulley to movement of the drive belt, the drive belt made from a sufficiently resilient material to limit noise associated with contact between the drive belt and the drive pulley and between the drive belt and the track,

the master car attachable to a drapery to provide for movement of the drapery, each of the auxiliary cars attachable to the drapery to provide for rolling support of the drapery when the drapery is moved by the master car.

16. The drapery pull system according to claim 15, wherein each of the roller members of the master car and the auxiliary cars comprises a wheel and a tire mounted on the wheel, the tire defining the track engaging portion of the roller member, and wherein the

resilient material of the roller members is polyurethane having between about 70 and about 94 durometer on a Shore A hardness scale.

17. The drapery pull system according to claim 15, wherein the resilient material of the drive belt is polyurethane having between about 80 and about 94 durometer on a Shore A hardness scale.

18. A drapery pull system for translating a suspended drapery or the like having reduced audible noise during normal operation comprising:

an elongated track, said elongated track having a first end and a second end, said elongated track having at least a first belt-contactable surface and at least a first roller-contacting surface;

a drive pulley rotatably supported adjacent to said first end, said drive pulley having a second belt-contacting surface;

an idler pulley rotatably supported adjacent to said second end, said idler pulley having a third belt-contacting surface;

a drive belt received about said drive pulley and said idler pulley for translation along said elongated track, said drive belt having a drive belt surface; and

a drapery support assembly comprising at least one car operably connected to said drive belt for translation along said elongated track, said car attachable to a drapery for translation of the drapery with respect to the track, said at least one car having at least one roller member rotatably connected thereto, said roller member having a track-contacting surface contacting said first roller-contacting surface,

wherein an interface between said first belt-contactable surface and said drive belt surface defines a first surface pair, an interface between second belt-contacting surface and said drive belt surface defines a second surface pair, an interface between said third belt-contacting surface and said drive belt surface defines a third surface pair, and an interface between said first roller-contacting surface and said track-contacting surface defines a fourth surface pair; and

wherein at least one of said surfaces of each of said first, second, third, and fourth surface pairs has a hardness less than 94 durometer Shore A scale, thereby reducing audible noise during normal operation of said drapery pull system.

19. The drapery pull system according to claim 18, wherein said track contacting surface and said drive belt surface each comprise resilient material having a hardness less than 94 durometer Shore A scale.

20. The drapery pull system according to claim 18, wherein said at least one of said surfaces of each of said first, second, third, and fourth surface pairs comprises a resilient material having a hardness greater than 70 durometer Shore A scale.

21. The drapery pull system according to claim 19 wherein said resilient material comprises polyurethane.

22. A motorized drapery pull system for translating a suspended drapery or the like having a reduced audible noise during normal operation comprising:

an elongated track, said elongated track having a first end and a second end;

a drive pulley rotatably supported adjacent to said first end; a motor operably coupled to said drive pulley;

an idler pulley rotatably supported adjacent to said second end;

a drive belt received about said drive pulley and said idler pulley for translation along said elongated track; and

at least one car operably connected to said drive belt for translation along said elongated track, said car attachable to a drapery for translation of the drapery with respect to the elongated track, said car having at least one roller member rotatably connected thereto;

wherein, during normal operation, the system produces an average sound level of less than 47 dbA at about 4 feet in any direction from said motor.

- 22 -

23. The motorized drapery pull system according to claim 22 further comprising a worm gear right angle drive coupling said motor to said drive pulley.

24. The motorized drapery pull system according to claim 22 further comprising a plurality of right angle drives coupling said motor to said drive pulley.

25. A car for use with a drapery pull system for translating a suspended drapery of the type having an elongated track, said elongated track having at least a first roller-contacting surface, comprising:

a car body;

a drapery attachment means which extends from said car body; and

at least one roller member rotatably connected to said car body,

wherein said at least one roller member has a track-contacting surface contacting said first roller-contacting surface, said track-contacting surface comprising a material having a hardness of durometer value between about 70 and about 94 on a Shore hardness scale A,

whereby acoustic noise is substantially reduced during normal operation of said drapery pull system.

26. A car for use with a drapery pull system for translating a suspended drapery of the type having an elongated track defining an elongated slot, said elongated slot having a first and a second side, comprising:

a car body;

a connecting portion;

a drapery attachment means; and

at least one roller member rotatably connected to said car body,

wherein said connecting portion extends through said elongated slot and connects said car body to said drapery attachment means, said connecting portion having a predetermined shape such that contact of said connecting portion with said first side and said second side of said elongated slot is substantially eliminated during normal operation of said drapery pull system.

27. The drapery pull system according to claim 26, wherein said connecting member has a predetermined shape such that said connecting member is capable of rolling more than 15 degrees in either direction about a roll axis without contacting said first and second elongated slot sides.

28. The drapery pull system according to claim 26, wherein said connecting member has a width that is less than 25 percent of the distance between said first and second sides of said slot.

29. The drapery pull system according to claim 26, wherein said connecting member can rotate more than 15 degrees in either direction about a yaw axis without contacting said elongated slot sides.

30. A drapery pull system having a substantially reduced audible noise during normal operation of the type having a master car body which engages an elongated track and a drive belt for translating said master car body with respect to said elongated track, comprising:

an elongated track;

a master car body;

at least one roller member rotatably connected to said car body, said at least one roller member engaging a portion of said elongated track;

a drive belt with a hardness of between 80-94 durometer Shore A scale connectable to said master car body for translating said master car body along said elongated track, whereby, during normal operation translation of said drive belt, audible noise is substantially reduced.

31. The drapery pull system according to claims 30, wherein said drive belt further comprises a toothed belt having teeth extending the width of said drive belt.

32. The drapery pull system according to claim 30, wherein said drive belt further comprises an internal support mechanism so as to increase the tensile strength of said belt over that which would exist without said internal support mechanism.

33. The drapery pull system according to claim 32, wherein said internal support mechanism is a plurality of flexible wires.

34. A drapery pull system for translating a suspended drapery or the like comprising:
an elongated track having a first end and a second end and comprising a housing portion, the housing portion defining a car compartment and a pair of belt compartments located on opposite sides of the car compartment, the car compartment defining at least one car contact surface, each of the belt compartments defining at least one belt contactable surface;

a drive belt received within the belt compartments of the track, the drive belt having a pulley contact surface and at least one track contactable surface;

a drive pulley rotatably supported adjacent the first end of the track, the drive pulley including a belt contact surface, the pulley contact surface of the drive belt contacting the belt contact surface of the drive pulley such that rotation of the drive pulley results in translation of the drive belt within the belt compartments of the track;

an idler pulley rotatably supported adjacent the second end of the track, the idler pulley including a belt contact surface, the pulley contact surface of the belt contacting the belt contact surface of the idler pulley; and

a drapery support assembly comprising at least one car received within the car compartment of the track, the car operably connected to the drive belt for translation of the car with respect to the track, the car comprising at least one roller member rotatably supported by the car, the roller member having a track contact surface that contacts the car contact surface of the track, the car attachable to a drapery for translation of the drapery with respect to the track,

the car contact surface of the track and the track contact surface of the car defining a first contact surface pair, the pulley contact surface of the drive belt and the belt contact surface of the drive pulley defining a second contact surface pair, the pulley contact surface of the drive belt and the belt contact surface of the idler pulley defining a third contact surface

pair and the at least one track contactable surface of the drive belt and each of the belt contactable surfaces of the track defining a fourth contact surface pair,

each of the first, second, third and fourth contact surface pairs including at least one surface having a Shore A durometer hardness that is less than 94.

35. The drapery pull system according to claim 34, wherein the drive belt comprises polyurethane having a Shore A durometer hardness that is less than 94.

36. The drapery pull system according to claim 34, wherein the roller member of the car comprises a tire having a portion that defines the track contact surface, the roller member further comprising a wheel on which the tire is mounted, and wherein at the least the portion of the tire that defines the track contact surface comprises a copolymer of Butadiene and Acrylonitrile having a Shore A durometer hardness that is less than 94.

37. The drapery pull system according to claim 34, wherein the roller member of the car comprises a tire having a portion that defines the track contact surface, the roller member further comprising a wheel on which the tire is mounted, and wherein at the least the portion of the tire that defines the track contact surface comprises polyurethane having a Shore A durometer hardness that is less than 94.

38. The drapery pull system according to claim 34, wherein at least the portion of the drive belt that defines the pulley contact surface comprises polyurethane having a Shore A durometer hardness that is less than 94.

39. The drapery pull system according to claim 34, wherein at least the portion of the drive belt that defines the track contactable surface comprises polyurethane having a Shore A durometer hardness that is less than 94.

40. The drapery pull system according to claim 34, wherein at least the portion of the track that defines the car contact surface comprises a polymer material having a Shore A durometer hardness that is less than 94.

41. The drapery pull system according to claim 40, wherein at least a portion of the track comprises a rigid material and wherein the portion of the track defining the car contact surface comprises a coating of the polymer material on the rigid material.

42. The drapery pull system according to claim 41, wherein the rigid material comprises aluminum.

43. The drapery pull system according to claim 34, wherein at least the portion of the track that defines the belt contactable surfaces comprises a polymer material having a Shore A durometer hardness that is less than 94.

44. The drapery pull system according to claim 43, wherein at least a portion of the track comprises a rigid material and wherein the portion of the track defining the belt contactable surface comprises a coating of the polymer material on the rigid material.

45. A drapery pull system comprising:

an elongated track comprising a housing portion that defines a car compartment, the elongated track including opposite panels that define an elongated slot in the car compartment;

a master car received within the car compartment of the elongated track, the master car comprising at least one pair of roller members rotatably supported by the master car, the master car operably connected to a drive system for translation of the master car with respect to the elongated track, the master car attachable to a drapery to provide for translation of the drapery with respect to the elongated track; and

a plurality of auxiliary cars received within the car compartment of the elongated track, each of the auxiliary cars comprising a body and a pair of roller members rotatably supported by the body, each of the auxiliary cars received in the car compartment of the

elongated track such that the pair of roller members contact the opposite panels and the body extends through the elongated slot of the elongated track, the extension of the body through the elongated slot of the elongated track providing for attachment of the drapery to the auxiliary cars for rolling support of the drapery,

the body of each of the auxiliary cars including a portion that is reduced in cross section with respect to adjacent portions of the body, the reduced portion of the body located adjacent the elongated slot when the auxiliary car is received in the car compartment of the elongated track, the reduced portion of the body allowing for misalignment between the auxiliary car and the elongated track without contact occurring between the car body and the panels of the elongated track thereby reducing noise.

46. The drapery pull system according to claim 45, wherein the body of the each of the auxiliary cars comprises a roller mounting portion for supporting the roller members, each of the auxiliary cars further comprising a pair of spaced legs connected to the roller mounting portion such that the legs extend through the elongated slot when the auxiliary cars are received in the car compartment of the elongated track, and wherein the reduced portion of the body comprises tapered portions of the legs.

47. The drapery pull system according to claim 46, wherein the body of each of the auxiliary cars further comprises a drapery attachment portion connected to the legs opposite the roller mounting portion, the drapery attachment portion adapted for receipt of a drapery support eye.

48. The drapery pull system according to claim 47, wherein the drapery attachment portion includes a notch for receiving an end of the drapery support eye.

49. A motorized drapery pull system comprising:

an elongated track having a first end and a second end and comprising a housing portion, the housing portion defining a car compartment and a pair of belt compartments located on opposite sides of the car compartment, the car compartment defining at least one

car contact surface, each of the belt compartments defining at least one belt contactable surface;

a drive belt received within the belt compartments of the elongated track, the drive belt having a pulley contact surface and at least one track contactable surface;

a drive pulley rotatably supported adjacent the first end of the track, the drive pulley including a belt contact surface, the pulley contact surface of the drive belt contacting the belt contact surface of the drive pulley such that rotation of the drive pulley results in translation of the drive belt within the belt compartments of the elongated track;

a drive motor operably connected to the drive pulley to rotate the drive pulley; and

a drapery support assembly comprising at least one car received within the car compartment of the elongated track, the car operably connected to the drive belt for translation of the car with respect to the elongated track, the car comprising at least one roller member rotatably supported by the car, the roller member having a track contact surface that contacts the car contact surface of the elongated track, the car attachable to a drapery for translation of the drapery with respect to the elongated track,

the car contact surface of the elongated track and the track contact surface of the car defining a first contact surface pair, the pulley contact surface of the drive belt and the belt contact surface of the drive pulley defining a second contact surface pair and the at least one track contactable surface of the drive belt and each of the belt contactable surfaces of the elongated track defining a third contact surface pair,

each of the first, second, third contact surface pairs including at least one surface having a Shore A durometer hardness that is less than 94,

the drapery pull system producing an average sound level of less than 47 dbA at about 4 feet in any direction from said motor during normal operation of the system.